DOCUMENT RESUME

ED 415 242 TM 027 893

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TITLE The Role of Parental Expectation, Effort, and Self-Efficacy in the Achievement of High and Low Track High School Students in Taiwan.
PUB DATE 1997-03-00
NOTE 33p.; Paper presented at the Annual Meeting of the American Educational Research Association (Chicago, IL, March 24-28, 1997).
PUB TYPE Reports - Research (143) -- Speeches/Meeting Papers (150)
EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Ability; Beliefs; Chinese; *Expectation; Foreign Countries; High Achievement; *High School Students; High Schools; *Mathematics Achievement; *Parent Attitudes; Parent Child Relationship; *Performance Factors; Pilot Projects; Private Schools; Public Schools; *Self Efficacy; Structural Equation Models; Track System (Education)
IDENTIFIERS *Effort; Taiwan

ABSTRACT

In this study, the effects of perceived parental expectation, trait effort, trait self-efficacy, trait ability, state self-efficacy, state effort, and state worry on the mathematics achievement of high and low track high school students in Taiwan were investigated. A hypothesized model of these constructs was also investigated using a structural equation model. A state scale and a trait scale were translated from English to Chinese and used in a pilot study and a main study. The pilot study involved 278 tenth graders in a one public and one private school. Results supported the reliability of the measure, and it was administered to 173 high-track high school students at a public school and 210 regular-track students. Both perceived parental expectation and trait effort were important components of success for these students. Students who perceived that their parents had high expectations tended to have high trait effort and belief in effort. The more state effort students expended, the more likely they were to have high grades in mathematics. The only route to achievement without direct mediation through state effort was from perceived parental expectation to students' trait effort, leading to trait self-efficacy and reaching higher achievement. High-track students had higher trait self-efficacy and state efficacy than regular-track students, with higher mean trait effort and more state effort. In addition, students who had higher perceived parental expectations tended to worry more, expending more state effort and achieving more highly. Overall, results demonstrate the positive role of believing in effort. (Contains 3 tables, 4 figures, and 33 references.) (SLD)

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The Role of Parental Expectation, Effort, and Self-efficacy in the Achievement of High and Low Track High School Students in Taiwan

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Poster presented at the 1997 Annual Meeting of the American Educational Research Association. Chicago, IL., March 24-28

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The Role of Parental Expectation, Effort, and Self-Efficacy in the Achievement of High and Low Track High School Students in Taiwan

Abbreviated Form

Introduction

Current information indicates that the American education system is in a crisis. In contrast, the Asian educational systems have demonstrated their academic excellence, especially in science and mathematics. The central hypotheses for Asian students' academic success are the belief in effort in the Asian culture, and the role of family as a motivating factor. In this study, based on the foundation of Weiner's (1994) attribution theory, Bandura's (1995) theory of self-efficacy and effort, and O'Neil's (1992) theory on worry, the authors investigated the effect of effort attributions and parental expectations on self-efficacy and achievement of Taiwanese intermediate high school students.

Theoretical Framework

Recent literature has indicated that cultural beliefs and parental expectation played an important role in students' motivation and achievement. Examining students' perception of parental expectation is important because the formation of one's attitude or beliefs can be influenced by the attitude, beliefs, and expectation of significant others (Tocci & Engelhard, 1991). As pointed out by Hawkins (1994) and Stevenson and Stigler (1992), American students, teachers, and parents

emphasize innate abilities as a component of success more strongly than the Asian students, teachers, and parents. These different cultural beliefs are essential components in developing the different behaviors and achievement patterns of the students. An over emphasis on innate abilities has great implications. American students who believe that their high ability is enough to ensure success may not work very hard; on the other hand, the American students who perceived themselves as having low ability, but do not believe success can be achieved through continued effort may not work very hard either (Stevenson & Stigler, 1992). In contrast, Asian students believed that the long hours and hard work they invested in school work will lead them to the mastery of their academic curriculum (Ebrey, 1991). For the Asian standards, high scores on a test are interpreted as result of hard work and persistence. Low scores are not taken as a sign of stupidity, but rather as an indication that the student needs to work harder to achieve what will be possible through persistence and hard work (Whang & Hancock, 1994). Therefore, an understanding of the belief systems about effort, ability, self-efficacy, and achievement in an Asian society would provide us a better understanding of what motivates the Asian students to become successful learners.

Perception of Parental Expectations

Stigler, Lee, and Stevenson (1990) suggest that the extraordinary success of the Asian students could be at least partially attributed to parental socialization. Parental socialization is exerted as conveyers of expectancies regarding their children's abilities and effort. A study conducted by Parsons, Alder, and Kaczala (1982) found that parental socialization is a critical mediator of children's achievement self-concept, as well as their actual mathematics performance.

One of the most important values that parents can transmit to their children involves attributing academic success to personal effort rather than to innate ability. Current research on Asian students indicates the importance of one's cultural background on the development of attributional beliefs (Hawkins, 1994). Asian children are found to be less convinced than their American peers that they are meeting their parents' expectations (Stevenson & Lee, 1990), and Asian students based their academic success and failure mainly on effort over ability while American students believed ability was the primary reason for their success (Holloway, 1988; Yao, 1985). Therefore, Asian parents transmit their cultural beliefs to their children, and urge them to perisit in time of hardship. This study investigated the role of perceived parental expectation as an influence on their children's Mathematics achievement.

Trait Ability and Trait Effort

Dweck and Elliot (1983) hypothesized that there are two different concepts of ability: entity and instrumental-incremental. The entity concept implies that ability is both a stable trait that is unchangeable, and a general trait that affects learning and performance. The instrumental-incremental concept of ability implies a possibility of continuous gain of ability and knowledge through study and practice.

In achievement situations, students either perceive their ability as fixed entity or as an incremental acquirable skill (Elliot & Dweck, 1988). Students who viewed ability as a fixed entity believed ability is inborned and cannot be changed. On task, they focus mainly on evaluative concerns about personal competence, which they believe are indicative of their intellectual capacity. Any mistakes represent personal and social evaluative threats, which imply lost of personal control (Bandura, 1991). Students who believed that they cannot effectively deal with these threats are

likely to experience high anxiety, because they tend to dwell on personal deficiencies rather than focusing on the task, which increases the chance for failure (Bandura, 1991). Therefore, those who subscribed to an entity view are likely to experience low self-efficacy beliefs and apply less effort on difficult tasks (Martocchio, 1994). The ability measure used in this study was an entity view, as according to Weiner's (1994) definition. We will test the Western based ability concept on the Asian subjects.

However, there is a different educational implications on believing in effort. In an 'effort' model, learning is portrayed as gradual and incremental, something that could be acquired through persistence and hard work (Elliot & Dweck,1988). Progress is attained step by step and is potentially available to anyone, since no matter what is your level, there is always someone at a higher level for you to challenge and seek improvement from. In this perspective, effort is an essential component towards improvement and fulfillment, and errors are thus seen as a natural part of learning (Elliot & Dweck, 1988). Dweck (1990) has claimed that effort attribution of negative achievement outcomes produced better achievement following failures. Under the same perspective, the results of Omura, Kambata, and Taxeduda's (1990) study also indicated that students who believe that effort and ability are inversely related are more likely to have helpless learning patterns, whereas, students having the concept that effort maximizes ability tend to hold mastery-oriented beliefs.

The emphasis on effort and ability also have different implications on Weiner's (1994), Bandura's (1993), and O'Neil's (1992) theories.

Weiner's Attribution Theory

Weiner (1994) assumed that students make causal judgments upon their experience with success or failure. The three dimensions of attributions are the loci of causality, stability, and controllability. Students who are motivated to success attribute their failure to internal, unstable factors that they can control, such as lack of effort, and their successes to a combination of high ability and effort. Failure threatened students tend to attribute their failures to stable, internal, and uncontrollable factors, such as lack of ability. This theory emphasizes the importance of attributing both successes and failures to effort, since effort is both unstable and controllable by the students, thereby giving students the chance to manipulate their resources and control their destiny. Wiener's (1994) attribution theory supports the contention that the success of Asians in the academic area is at least partly due to their cultural belief in effort (Stevenson & Stigler, 1992).

Bandura's Self-Efficacy Theory

Bandura's (1993) self-efficacy theory echoed the importance of stressing the belief in effort and the conception of ability as an acquirable skill among the students. According to the self-efficacy theory, students with self-perceptions of low ability are easily discouraged by failures to obtain the goals they set for themselves, whereas the students who are confident of their ability intensify their efforts when failure occurs and persist until they succeed. Therefore, by stressing ability as an acquirable skill independent of their actual ability, students could maintain a feeling of being in control and a sense of resiliency, even in face of difficulty.

O'Neil's Theory on Worry

O'Neil et al. (1992) have demonstrated that worry has consistently shown a negative correlation with achievement performance. Worry affects performance by interfering with the

students' ability to accurately discriminate among stimuli (Martocchio, 1994). It is believed that students who see ability as an acquirable skill, believe that their capability can be continually improved by building their competencies through practice (Elliot & Dweck, 1988). These students are likely to interpret mistakes as feedback rather than as a threat (Wood & Bandura, 1989). These beliefs are likely to be manifested in lower worry and greater self-efficacy, which in turn, leads to enhanced learning (Martocchio, 1994).

Differences in High and Low Achievers

The effect of effort attribution on academic achievement could be best demonstrated in the difference in causal attribution between high and low achievers. High achievers attribute success to high ability and high effort, and failure to lack of effort, while low achievers attribute success to external factors, and attribute failure to lack of ability (Weiner, 1994). Differences in self-efficacy and persistence time were also found between high and low achieving students (Bandura, 1993). Parents of high achieving students also were found to have higher expectations from their children than low achieving students (Stevenson & Stigler, 1992).

In this study, the effect of perceived parental expectation, trait effort, trait self-efficacy, trait ability, state self efficacy, state effort, and state worry on the mathematics achievement of the high and low track high school students in Taiwan was investigated. Further, a hypothesized model of the relationships of these constructs was investigated using the structural equation model.

Method

The design of this study is non-experimental. The design included measuring the following latent constructs: perceived parental expectation, students' belief in effort, students' belief in ability, trait self-efficacy, state self-efficacy, state effort, state worry, and achievement. Due to the fact that the study was conducted with Chinese students in Taiwan, the questionnaires were translated into Mandarin Chinese by the author. In order to make sure that the Chinese version was equivalent to the English version, a back translation technique was employed. As an initial step, the author translated the questionnaires into Mandarin Chinese. The back translation from the Chinese version into English form was completed by a bilingual Educational Psychology major graduate student who has taught in a prominent high school in Taiwan and understood the underlying constructs. The original and the back translation of the questionnaire were judged for their equivalence using the guideline proposed by Hui & Triandis (1985). A detail discussion and careful adjustment for any discrepancies between the original and back translation forms were conducted between the author and the back translator until all agreements were met. Therefore a 46 items trait scale, and a 18 items state scale in English was translated into a 46 items traits scale and a 18 items state scale in Chinese.

The study was conducted in Taiwan in two phases. Phase 1, the pilot study, investigated the reliability of the measures. Phase 2, the main study, tested the hypothesized model. In both phases the relationship of tracking was investigated.

Data Sources

The subjects of the pilot study consisted of 278 Chinese high school tenth grade students, with 142 attending a prominent public high school and 136 attending a mediocre private high school. The trait questionnaire was administered to the students a month prior to their quarterly mathematic examination to determine such trait constructs as : ability, effort, self-efficacy, and parental expectation. The state questionnaire was administered to the students the morning following their quarterly examination to tap their state constructs such as : state effort, state self-efficacy and state worry. After the pilot questionnaire testing had been conducted each sub-scale was checked for internal consistency using Cronbach's alpha. The SPSS/PC (1989) program was used for the reliability analysis for the scales, the exploratory factor analysis using varimax rotation was used to investigate the factor loadings; and Bentler's (1993) structural equation program, EQS for Windows V.4.00,was used for the confirmatory factor analysis. Joreskog (1993) recommended that a confirmatory factor analysis be conducted to see if the parameters make sense, and also to make sure that the indicators do not violate the assumption of unidimensionality. The results of the pilot study indicated acceptable reliability of all of the measures. The resulting reliabilities of the scales as shown in Table 1.

Table 1.

Reliabilities of The Revised Pilot Scales

Scales	Revised scale *a* reliability	# of Factors	# of items
Perceived Parental Expectation	.83	1	8
Trait Effort	.76	1	8
Trait Self-Efficacy	.90	1	8
Trait Ability	.78	1	8
State Effort	.85	1	6
State Self-Efficacy	.87	1	6
State Worry	.69	1	5

Confirmatory analysis showed an comparative fit index of .95 on the trait scales and .98 for the state scales.

The subjects of the main study consisted of 383 Chinese intermediate high school ninth grade students, attending a prominent public intermediate high school in Taipei. One hundred seventy-three of these students were discreetly assigned by the school to classes of higher academic standards. Two hundred and ten of these students were assigned to regular track classes. A questionnaire on trait constructs regarding perceived parental expectation, trait ability or belief in ability, trait effort or belief in effort, and trait self-efficacy was distributed to students one month prior to their mathematics final examination. A questionnaire for state constructs of effort, self-efficacy, and worry was distributed to the students right after their taking of the mathematics final examination. Reliabilities of the scales were tested with satisfactory results, as shown in Table 2.

Table 2.

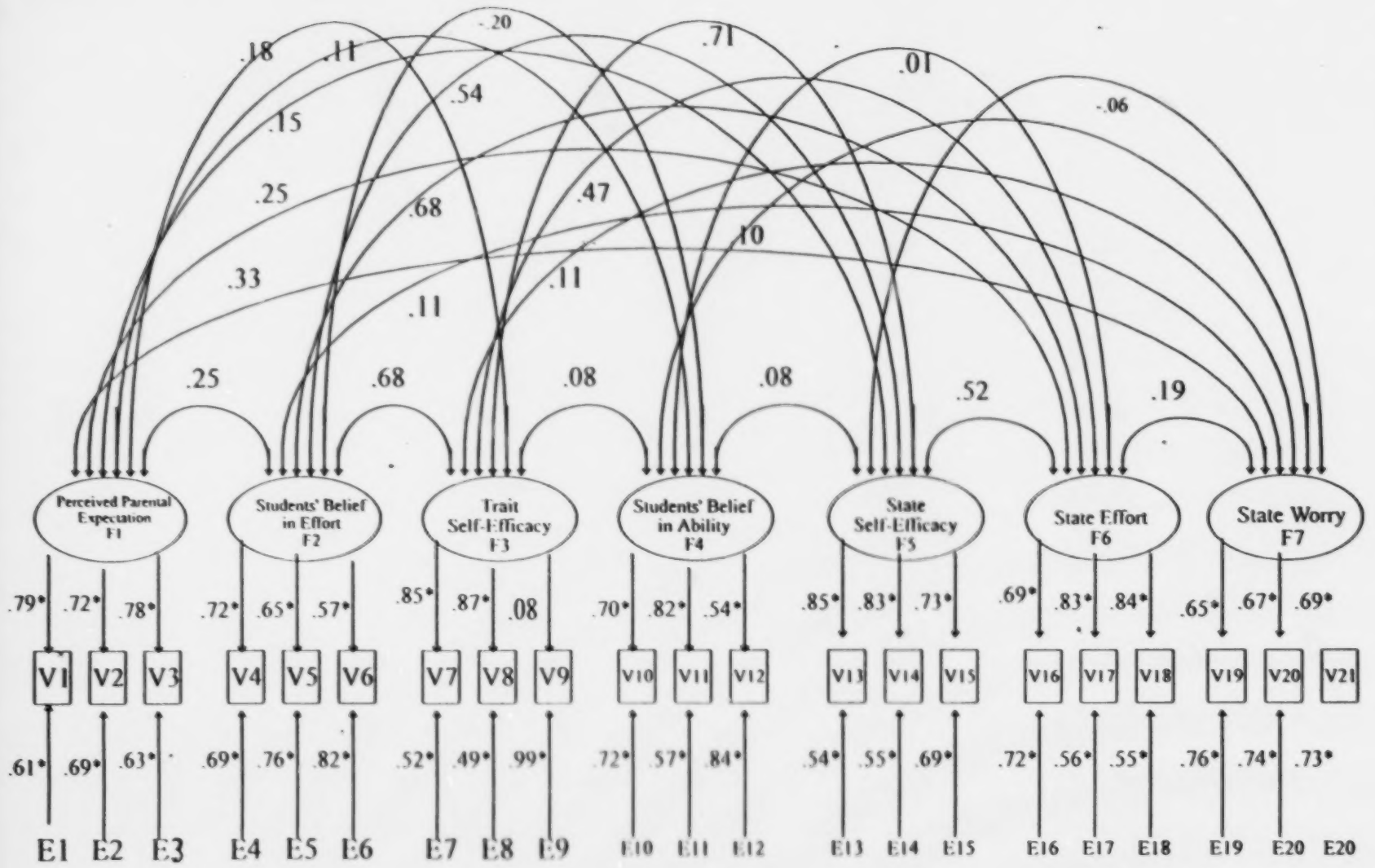
Reliability of The Revised Main Scales

Scales	Revised scale *a* reliability	# of Factors	# of Items
Perceived parental Expectation	.87	1	8
Trait Effort	.74	1	8
Trait Self-Efficacy	.88	1	8
Trait Ability	.74	1	8
State Effort	.81	1	6
State Self-Efficacy	.86	1	6
State Worry	.69	1	7

A measurement model as shown in Figure 1 with 7 factors and 21 indicators was tested with the confirmatory analysis. The confirmatory analysis implements the researcher's hypothesis about the structure of the variables and test the adequacy of these hypothesis using a statistical approach (Bentler, 1992). It allows a researcher to test the hypothesis that a linkage between the observed variables and their latent factors actually exists (Byrne,1994). The Comparative Fit Index of .95 suggested that the measurement model provided a good representation of the data.

Data were thus analyzed using the multivariate analysis of variance and the path analysis of the structural equation models.

Fig. 1



The Measurement Model

Results

The multivariate analysis of variance (manova) and subsequent anovas indicated that high track students showed a significant difference in the factors and in terms of higher mathematics achievement, more trait effort, and higher trait self-efficacy than the regular track students. However, the high and regular track students did not differ in trait ability, and perceived parental expectation. The same results were observed from both the pilot and the main study.

In the structural model, the correlation matrix of the indicator for eight latent variables and 22 indicators were used in testing the hypothesized model. Path analysis was conducted, using the EQS Window Program by Bentler (1993). Structural equation modeling is a statistical methodology that takes a confirmatory approach to hypothesis testing. This theory represents the "causal" processes that generate observations on multiple variables (Bentler, 1988). There are two important aspects of the procedure: (a) that the causal process under the study represented by a series of structural equations, and that (b) these structural equations can be represented in the form of a pictorial model. The hypothesized model can then be tested statistically in a simultaneous analysis of the entire system of variables to determine the extent to which it is consistent with the data (Byrne, 1994).

The result as shown in Figure 2. The significant results showed that high perceived parental expectation lead to high trait effort. Students who had high trait effort, in turn expended more state effort during the mathematics examination and achieved higher academic results. Trait

effort and state effort were found to be among the major influences for these Taiwanese intermediate high school students' success.

Even though the goodness of fit test of the model was acceptable (CFI = .916) a careful reinvestigation of the underlying theory and constructs by looking at the results of the hypothesized model, now termed model A, suggested the addition of two paths (from perceived parental expectation to state worry, and from state worry to state effort) will enhance the explanation power of the structural path of this hypothesized model. Especially when the two original paths to and from the state worry construct (from trait self-efficacy to state worry, and from state worry to achievement) were both insignificant. This improved model, now termed model B, as shown in figure 3, found both of these added paths to be significant. Perceived parental expectation was found to heighten students' state worry, which in turn increased their state effort, thus resulted in higher achievement.

However, there were six insignificant paths in models A and B. The six insignificant paths were: 1) from perceived parental expectation to trait self-efficacy; 2) from trait self-efficacy to state worry; 3) from state worry to achievement; 4) from state self-efficacy to achievement; 5) from belief in ability to state effort; 6) from perceived parental expectation to trait ability. Due to the hypothesized theory of belief in effort and ability in this study, it was essential to keep the path from perceived parental expectation to trait ability. The other five insignificant paths were removed from the model. The resulting model, termed model C, as shown in figure 4, showed a comparative fit index of .925. The authors thus concluded that model C provided a good fit to the data. Table 3 provided a comparison of the three models.

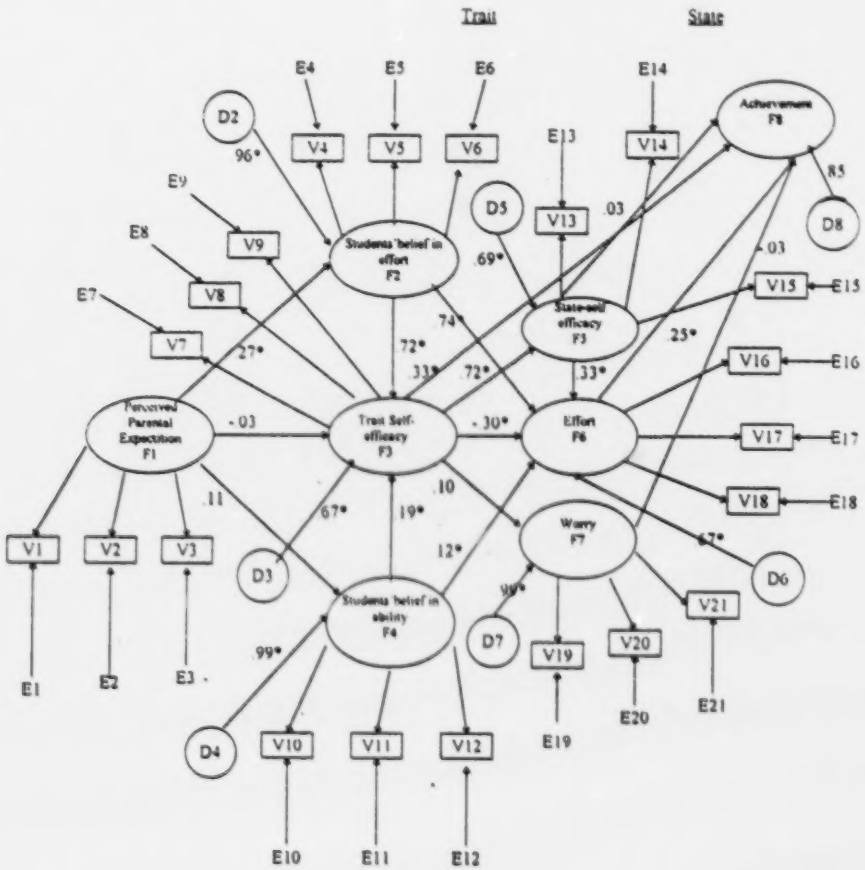
Table 3.

A Comparison of the Three Models

	Model		
	A	B	C
Variance	98.42%	100%	99.6%
Chi-square	492.29	422.40	426.11
Degree of Freedom	195	193	198
p	< .001	< .001	< 001
Comparative Fit Index	.911	.925	.925

Note: Model A = hypothesized model; Model B = Model A with modification indices; Model C = Model B with five insignificant paths removed.

Figure 2.



The Complete Hypothesized Model

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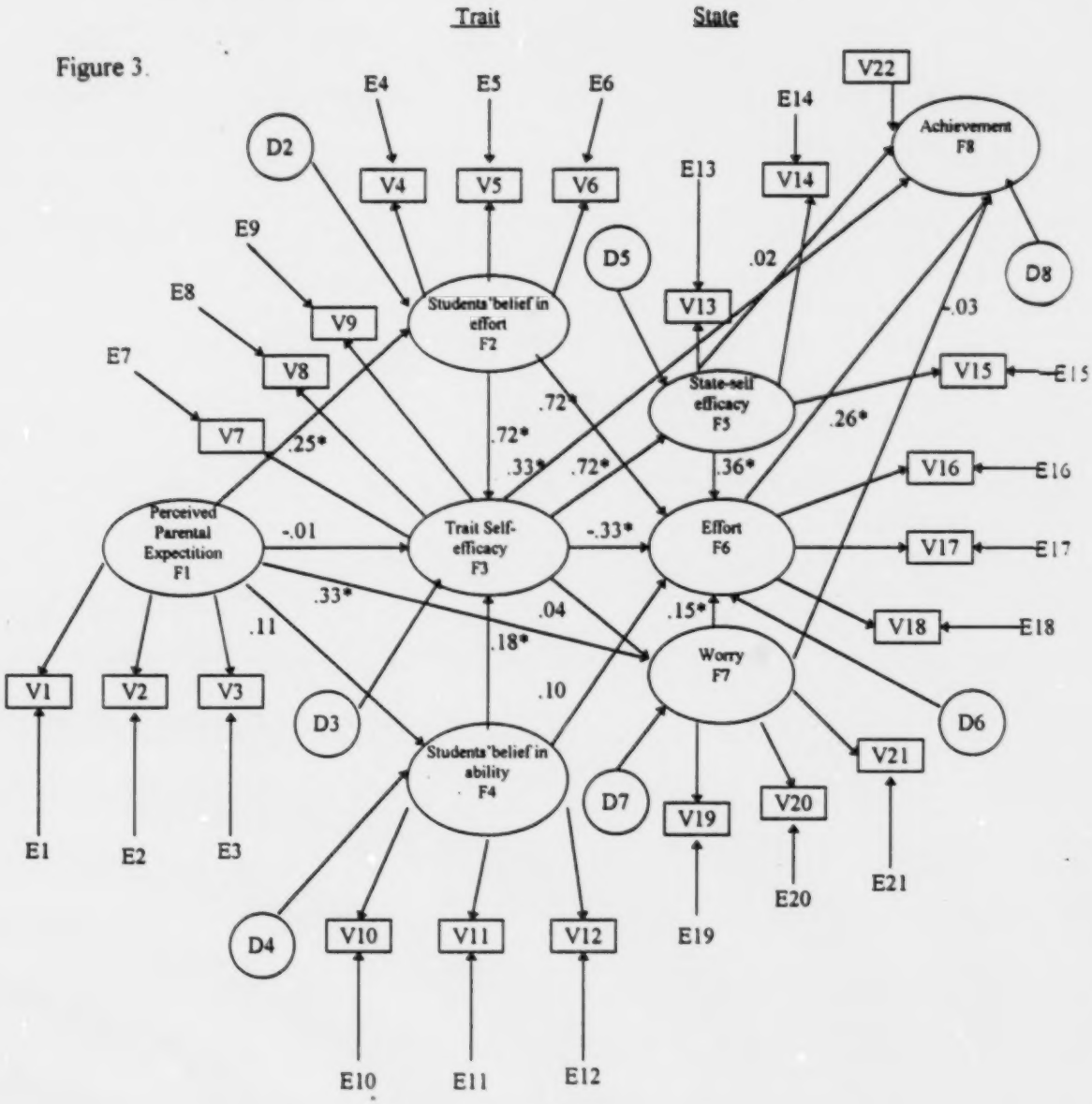
Figure 3.



Model B of The Complete Hypothesized Model

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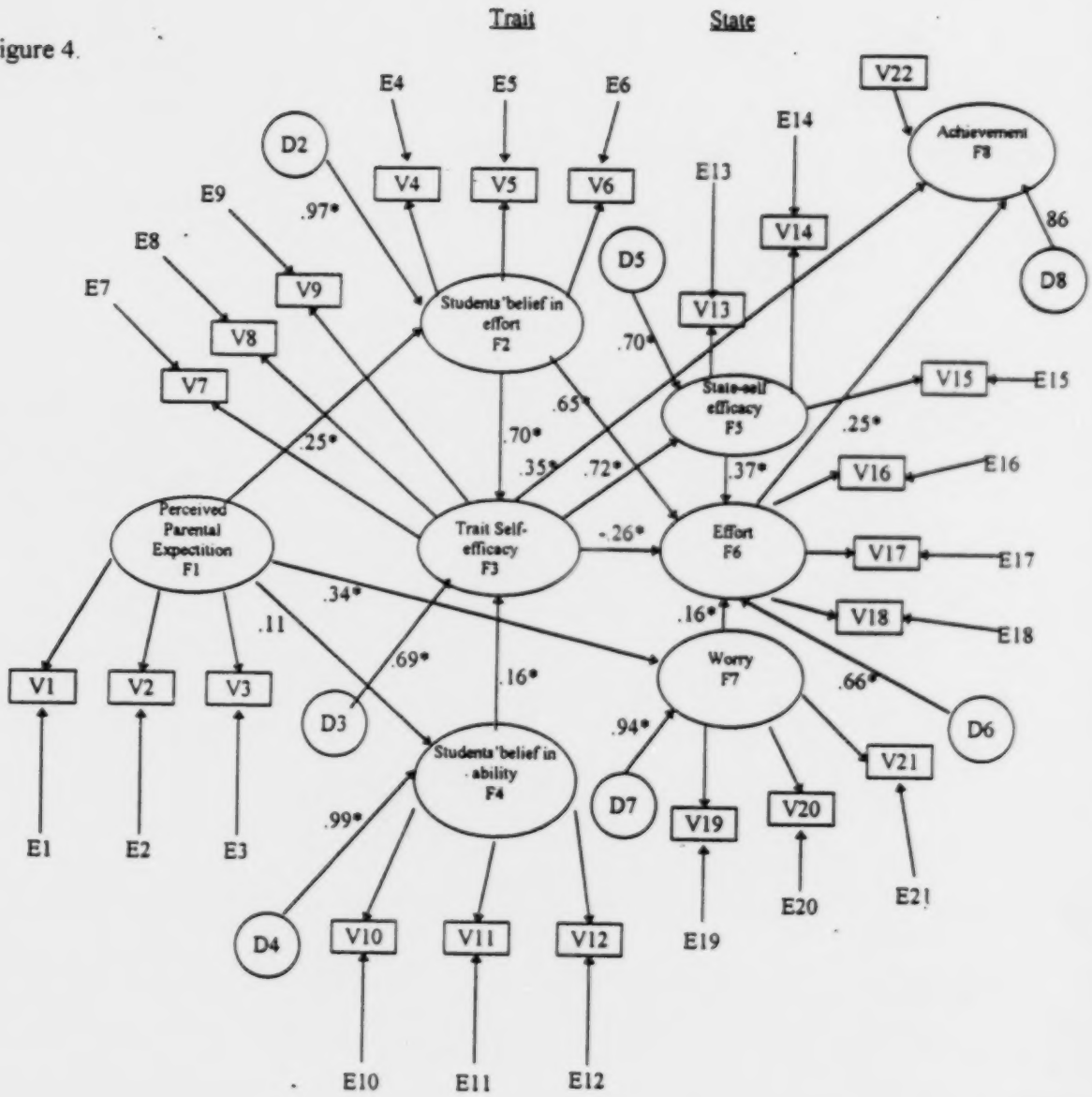
Figure 4.



Model C of The Complete Hypothesized Model

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Discussion

The results of the multivariate analysis of variance and the subsequent F-tests showed that achievement, trait effort, and trait self-efficacy were all significant in favor of the high track group. These results supported the theories of Dweck and Elliot (1983) on effort attribution, and the theories of Bandura (1995) and Schunk (1991b) on self-efficacy However, perceived parental expectation and trait ability were not significant, suggesting that high and regular track students did not differ in these constructs. As indicated in the review of literature, Taiwanese parents tend to set high expectations (Stevenson & Stigler, 1990), students may have perceived their parents expecting a lot out of them no matter what track they were in. Yet, perceived parental expectation had no significant effect on students' trait ability. This could be explained by the reasoning that even some students may believe in ability, the cultural emphasis on effort could have altered the dimensions of stability and controllability of the construct of trait ability. Also, since this sample was from an intermediate high school that was performing at above national average standards, and the parents were also mainly from professional and well educated families that would not represent the norm. This selective sample may have distorted the expected negative results between track and belief in ability.

In the model testing, it was hypothesized that the higher the standards and expectations students perceived their parents to have on them, the higher their belief in effort. In contrast, the higher the perceived parental expectations, the lower the students will belief in ability. These hypothesis were generated under the conceptual base that Chinese parents who have higher

expectation would also stress on the importance of expanding effort to achieve them (Stevenson & Stigler, 1992). The first part of the hypothesis was confirmed. Students who perceived their parents to have high expectation also tend to belief in effort. However, perceived parental expectation had no significant effect on students' belief in ability. As above, this could be due to the general cultural emphasis on effort. Even though individual difference in ability is recognized, effort is believed to be able to compensate for the lack of ability. Effort is always emphasized and ability de-emphasized. The fact that perceived parental expectation had no effect on students' belief in ability may be a reflection of these cultural values. Even though some students may belief in ability, the cultural emphasis on effort may have altered the dimensions of stability and controllability of the construct of trait ability which is validated in the Western model of attribution (Weiner, 1994).

Contrary to the literature review and Bandura's (1993) theory, trait self-efficacy was found to have negative effect on students' state effort. Students who were confident about their capability and have a positive outcome expectation were found to invest less effort during examination. It could be explained that in Asian culture, self-efficacy may not be such an important factor as in the Western culture. Asian culture emphasize humbleness and discourage any public display of self-assertiveness, or over confidence, or exaggeration of success expectancy. This cultural effect might have rendered the concept of self-efficacy less meaningful in cultures that stress different values. Asian students had been found to have lower self-efficacy than American subjects even though their achievement is higher. This effect of low self-efficacy in Asian subjects had also been found in Eaton's (1994) study. Thus, those students who indicated a high self-efficacy may be the students who tend to boost themselves, were over confident and thereby, did not think they need to apply more effort to succeed.

It was also hypothesized that perceived parental expectation would have a positive effect on students' trait self-efficacy. It was expected that high parental expectation would give students a sense of capability as they perceived that their parents have confident in them. This hypothesis was not supported, the path was insignificant. If the general Chinese cultural theme is belief in effort, and all parents set high expectations, instead of perceiving their parents have faith in them, the high parental expectation would be suggesting to them that they have not met their parents' standards yet. They need to work harder and get even better grades. This may not give them a sense of confidence and capability, which is essential in students' sense of self-efficacy.

The cultural effect may also be influencing students' state self-efficacy, as state self-efficacy was surprisingly found not to be related to achievement. Since the Chinese culture emphasize humbleness instead of over confidence, in a way, no body is ever good enough since there would always be someone who could do even better. Studies have found that Asian American students have lower self-efficacy even when the scored higher than their American counter parts (Eaton, 1994). That may explain why this path is not significant.

Worry had some unexpected results in this study. It was hypothesized that students with high trait self-efficacy would experience less worry during examination. The findings of this research showed students' trait self-efficacy had no significant effect on the students worry during examination. A comparison of the item mean score showed that this group of students tend to worry more than the students of the other similar studies (Malpass, 1995, Li, 1994). This could be due to the grade level they were in. These students were attending the last year of intermediate high school, their test scores and achievement ratings would be very important to them in their placement of a prestigious or other wise high school next year. This could explain the reason these students

who have high trait self-efficacy, but they would still be worried and render this path insignificant. This could also explain why the path from worry to achievement was not negatively significant as predicted as well. Even though they performed well, these students were still worried that they were not good enough.

For the major hypotheses, it was found that there is a definite impact of parental expectation on students trait effort. Consistent with studies that indicate Asian students perform well due to parental factor and effort attribution (Stevenson & Stigler, 1992; Eaton, 1995), this study also found that high parental expectation led to stronger belief in effort. Therefore, the students who are high in trait effort, employed effort attribution as their causes for success and failure, and in accordance with Weiner's (1990) attribution theory, effort attribution which is internal, stable, and controllable, will likely lead to students' academic success. In short, students who perceived their parents expect more out of them, and who ascribe effort as the cause of success or failure, will expand more state effort during task, and are more likely to attain higher achievement.

Parental expectation also has another indirect effect on students' achievement. Students who perceived their parents expect more from them tend to be more worried during the examination and thus expand more state effort and achieve better (Mueller, 1992). Therefore, perceived parental expectation and effort attribution have demonstrated definite influences on students' achievement.

Conclusion

This study found that both perceived parental expectation and trait effort were important components for the success of this group of Taiwanese intermediate high school students. Students

who had high perceived parental expectation tended to believe in effort. Students who believed in effort also had high trait self-efficacy and state self-efficacy, leading to the expanding of more state effort during examination, resulting in successful mathematics final outcomes.

There are four routes of achievement through effort:

1) It was found that when students perceived that their parents had high expectations for them, they tended to have high trait effort and belief in effort. When the students believed in effort, they retained a sense of controllability of their success or failure, they believed that success could be achieved through expanding effort, which is internal and controllable (Weiner, 1994). Since they were in control, they had a higher trait self-efficacy, which means a confidence in their capability of expanding effort to master a task, and expectancy of eventual successful outcome (Bandura, 1993). Higher trait self-efficacy led to higher state self-efficacy, and these students expended more state effort leading to successful examination outcomes.

2) Another route of students' success was through students' perceived high parental expectation, which led to high trait effort, and thereby to state effort. The more the students expended their state effort in preparing and taking the examination, the more likely that they would achieve highly.

3) The third and only route to achievement without direct mediation through state effort was from perceived parental expectation, to students' trait effort, thus leading to trait self-efficacy and reaching higher achievement. However, according to Bandura (1993), self-efficacy leads to achievement because the confidence and positive outcome expectancy prompted the students to expend more effort and persistence in accomplishing the task. Therefore, effort's presence was still implied.

4) A fourth route from perceived parental expectation to trait effort to trait self-efficacy to state effort and to achievement showed students who had high perceived parental expectation, they would also tend to have high trait effort and a sense of trait self-efficacy. However, due to cultural differences, their trait self-efficacy could be interpret differently, these students may be over confident, thus expanding less state effort in preparing and completing the examination, resulting in lower achievement.

The above routes all demonstrate the importance of effort. As also indicated in the results of the multivariate analysis, high track students had a higher trait self-efficacy and state efficacy than the low track students, they also had a higher mean in trait effort, and they expended more state effort. Thus by believing in effort, students at all levels were given a chance to succeed. The more the students believe in effort, the more effort they expended, the more likely for high achievement.

There were three structural paths from trait ability to achievement in this model:

1) First of all, students' perceived parental expectation had no significant effect on their trait ability. However, some of those students who had a high trait ability may also had a higher sense of trait self-efficacy and confidence in themselves, and a sense of persistence in tasks, thus they expended more state effort during examination, resulting in higher achievement.
2) Another path showed students who believed in ability had a sense of competence and a high trait self-efficacy. These students also had a confidence in this specific mathematics class which showed in high state self-efficacy, this would lead to more state effort expended, and thus higher achievement.

3) A third route for the students who believed in ability was through trait self-efficacy to achievement. As mentioned above, trait self-efficacy implied that the students would be willing to expend effort, thus improving achievement.

Although achievement could be faciliated through trait ability or trait effort, those who believed in effort could master success no matter which level they started at, because as long as the students believed they were in control, they could always expend more effort, even in face of failure. Thus they would eventually reach success. However, those who believed in ability would be successful only if they believed they were smart (Weiner, 1994). Thus, through a sense of trait self-efficacy, they expended state effort and reached achievement. However, if they believed they do not have the ability, they would have a sense of low self-efficacy, and they would give up before they even tried (Dweck & Elliot, 1988).

Another important finding in this study was the route from perceived parental expectation to state worry, to state effort, to achievement. It showed students who had high perceived parental expectation also tended to worry more during the examination, thus expanding more state effort and achieve better.

It was also found that students' perceived parental expectation had no effect on their trait ability. However, trait ability could also lead to successful mathematics final examination outcome through the path of trait self-efficacy, state self-efficacy, and state effort. The more state effort the students expanded, the more successful the outcome of the mathematics final examination.

Educational and Scientific Importance

The results of this study demonstrated the positive role of believing in effort in the Taiwanese students, supporting Elliot and Dweck's (1988) theory of the importance of effort attribution cross-culturally. Students who believed in effort also had higher state self-efficacy beliefs knowing that by trying harder and persisting longer, they will eventually succeed, thus supporting Bandura (1995) self-efficacy theory cross-culturally as well.

Another contribution of this study was the empirical support that that was offered to Stevenson and Stigler (1992) theory on Asian elementary children, and to confirmed their findings on subjects of a higher grade level of intermediate high schools. Parental expectation was shown to have a definite impact on students' achievement. Parents who had high standards and expectations had children who achieved higher grades. Students would expend more effort in an attempt to meet the standards and expectations set by their parents thus resulting in higher achievement.

In this study, it was also found that by believing or attributing to effort, the students would eventually reach success. This finding supports Weiners' theory (1994) that by attributing to effort, which according to Weiner (1994) is internal and controllable, students would retain a sense of being in control and a sense of resilience, which would lead them to persistence and eventual success, thus supporting this part of Weiner (1994) attribution theory in this group of students.

Since this study was conducted in Taiwan with Chinese high and regular track students as participants. Due to cross-cultural differences, there may be difficulty in applying the results of this

study to American students. It is recommended to replicate this study in America with the same measures, but with American and Asian-American students as subjects. A replication of this study in America would offer more insights as to how we could use the findings of this research to improve our educational systems.

References

Bandura,, A. (1991). Social cognitive theory of self-regulation. Organizational Behavior and Human Decision Processes, 50, 248-287.

Bandura, A. (1993). Perceived self-efficacy in cognitive development and functioning. Educational Psychologist. 28 (2), 117-148.

Bandura, A. (1995). Self-efficacy in changing society. Cambridge, NY: Cambridge University Press.

Bentler, P. M. (1988). Causal modeling via structural equation systems. In J. R. Nesserlroade & R. B. Cattell (Eds), Handbook of multivariate experimental psychology (2nd ed., pp. 317-335) New York: Plenum.

Bentler, P. M. (1992). EQS. Structural equations program manual. Los Angeles: BMDP Statistical Software, Inc.

Bentler, P. M. (1993). EQS, A Structural Equation Program (Version 4.0) (Computor Software). Los Angeles: BMDP Statistical Software, Inc.

Byrne, B. M. (1994). Structural equation modeling with EQS and EQS/Windows. Thousand Oaks, Ca: Sage.

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Dweck, C. S. (1990). Self theories and goals: Their role in motivation, personality, and development. Nebraska symposium on motivation (Vol. 38, pp199-235). Lincoln, NE: University of Nebraska Press.

Dweck, C. S., & Elliot, E. S. (1983). Achievement Motivation. In P.H. Mussen (Ser. Ed.) & E. M. Heatherington (Vol. Ed.), Handbook Of Child Psychology: Vol.4.

Eaton, M. J. (1994). Asian American Motivation: Determining the effects of students' beliefs about learning versus perceptions of self-efficacy. Unpublished doctoral dissertation. Los Angeles: USC.

Ebrey, P. (1991). The Chinese family and the spread of Confucian values. In G. Rozman (Ed.), The East Asian region: Confucian heritage and its modern adaptation. Princeton, NJ: Princeton University Press.

Elliot, E. S., and Dweck, C. S. (1988). Goals: An approach to motivation and achievement. Journal of Personality and Social Psychology, 54, 5-12.

Hawkins, J. N. (1994). Issues of motivation in Asian Education. In H. F. O'Neil, Jr., & Drillings, M. (Eds.), Motivation: Theory and Research (pp. 101-115). Hillsdale, NJ: Erlbaum.

Holloway, S. D. (1988). Concepts of ability and effort in Japan and the United States. Review of Educational Research, 58, 327-345.

Hui, C H., & Triandis, H. C. (1985). Measurement in cross-cultural psychology: A review and comparison of strategies. Journal of Education Psychology, 16(2), 131-152.

Joreskog, K. G., & Sorbom, D. (1989). Lisrel 7: A guide to the program and applications(2nd ed.). Chicago: SPSS Inc.

Malpass, J. R. (1995). A structural model of self-efficacy, goal orientation, worry, self-regulated learning, and high stake mathematics achievement. Unpublished doctoral dissertation. Los Angeles: USC.

Martocchio, J. J. (1994). Effect of conceptions of ability on anxiety, self-efficacy, and learning in training. Journal of Applied Psychology, 79, 819-82.

Omura, A., Kambata, M., & Taxetmuda, S. (1990). A causal attribution model of academic achievement in senior high school. Japanese Psychological Research, 32, (3), 137-147.

O'Neil, H. F., Sugrrue, B., Abedi, J., Baker, E. L., & Golan, S. (1992). Report of experimental studies on motivation and NAEP test performance (Final Report to the National Center for Education Statistics, Contract No. RS90159001). Los Angeles: University of California National Center for Research on Evaluation Standards, and Student Testing.

Parsons, J., Alder, T., & Kaczala, C. (1982). Socialization of achievement attitudes and beliefs: Parental Influences. Child Development, 53, 310-321.

Schunk, D. H. (1991b). Self-efficacy and academic motivation. Educational Psychologist, 26,207-231.

SPSS Inc. (1989). SPSS?PC+ update for V 3.0 and V3.1. Chicago: SPSS Inc.

Stevenson, H., & Lee, S. Y. (1990). Context of achievement: A study of American, Chinese, and Japanese children. Monographs of the Society for Research in Child Development, 55.

Stevenson, H.W., & Stigler, J. W. (1992). The Learning Gap. New York: Summit Books.

Stevenson, H. W., & Stigler, J. W. (1992). The Learning Gap. New York: Summit Books.

Stigler, J. W., Lee, S. Y., & Stevenson, H. W. (1990). Mathematics Knowledge of Japanese, Chinese, and American elementary school children. Reston, VA: National Councils of Teachers of Mathematics.

Toccci, C. M., & Engelhard, G. (1991). America 2000: An Education Strategies. Washington, D. C.: U. S. Department of Education.

Weiner, B. (1994). Integrating Social and Personal Theories of Achievement Striving. Review of Education Research, 64, 557-573.

Weiner, B. (1994). Ability versus effort revisited: The moral determinants of achievement evaluation and achievement as a moral system. Educational Psychologist, 29 (3), 163-172.

Whang, P. A., & Hancock, G. R. (1994). Motivation and Mathematics achievement: Comparison between Asian-American and non- Asian students. Contemporary Educational Psychology, 19, 302-322.

Wood, R., and Bandura, A. (1989). Impact of conceptions of ability on self-regulatory mechanisms and complex decision making. Journal of Personality and Social Psychology, 56, 407-415.

Yao, E. L. (1985). Chinese personality and its changes. In M. H. Bond (Ed.). The psychology of the Chinese people. Hong Kong: Oxford Press.